

In re Application of: Aharon J. AGRANAT
Serial No.: 10/542,923
Filed: July 21, 2005
Office Action Mailing Date: December 2, 2008

Examiner: Shi K. LI
Group Art Unit: 2613
Attorney Docket: 29885

Amendments to the Drawings:

An attached sheet of drawings, designated as Sheet 1/14, includes amendments to Figure 1a as required by the Examiner. In Figure 1a, legends are added for the boxes. Figure 1a is relabeled "FIG. 1A" to match references in the specification.

An attached sheet of drawings, designated as Sheet 2/14, includes amendments to Figure 1b as required by the Examiner. In Figure 1b, legends are added for the boxes. Figure 1b is relabeled "FIG. 1B" to match references in the specification.
Reference characters and lead lines are corrected.

An attached sheet of drawings, designated as Sheet 3/14, includes amendments to Figure 2a as required by the Examiner. In Figure 2a, legends are added for the boxes. Figure 2a is relabeled "FIG. 2A" to match references in the specification.
Reference characters and lead lines are corrected.

An attached sheet of drawings, designated as Sheet 4/14, includes amendments to Figure 2b and Figure 2c. Figure 2b is relabeled "FIG. 2B" and Figure 2c is relabeled "FIG. 2C" to match references in the specification.

An attached sheet of drawings, designated as Sheet 5/14, includes amendments to Figure 2d as required by the Examiner. In Figure 2d, legends are added for the boxes. Figure 2d is relabeled "FIG. 2D" to match references in the specification.
Lead lines are corrected.

An attached sheet of drawings, designated as Sheet 6/14, includes amendments to Figure 2e as required by the Examiner. In Figure 2e, legends are added for the boxes. Figure 2e is relabeled "FIG. 2E" to match references in the specification.
Reference characters and lead lines are corrected.

An attached sheet of drawings, designated as Sheet 7/14, includes amendments to Figure 2f and Figure 2g as required by the Examiner. In Figure 2f and Figure 2g, legends are added for the boxes. Figure 2f is relabeled "FIG. 2F", and Figure 2g is relabeled "FIG. 2G" to match references in the specification.

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An attached sheet of drawings, designated as Sheet 8/14, includes amendments to Figure 2h as required by the Examiner. In Figure 2h, legends are added for the boxes. Figure 2h is relabeled "FIG. 2H" to match references in the specification.

An attached sheet of drawings, designated as Sheet 9/14, includes amendments to Figure 3a as required by the Examiner. In Figure 3a, legends are added for the boxes. Figure 3a is relabeled "FIG. 3A" to match references in the specification.

An attached sheet of drawings, designated as Sheet 10/14, includes amendments to Figure 3b as required by the Examiner. In Figure 3b, legends are added for the boxes. Figure 3b is relabeled "FIG. 3B" to match references in the specification.

An attached sheet of drawings, designated as Sheet 11/14, includes amendments to Figure 4 as required by the Examiner. In Figure 4, legends are added for the boxes. Figure 4 is relabeled "FIG. 4" to match references in the specification.

An attached sheet of drawings, designated as Sheet 12/14, includes amendments to Figure 5a as required by the Examiner. In Figure 5a, legends are added for the boxes. Figure 5a is relabeled "FIG. 5A" to match references in the specification.

An attached sheet of drawings, designated as Sheet 13/14, includes amendments to Figure 5b as required by the Examiner. In Figure 5b, legends are added for the boxes. Figure 5b is relabeled "FIG. 5B" to match references in the specification. Reference characters and lead lines are corrected.

An attached sheet of drawings, designated as Sheet 14/14, includes amendments to Figure 6a and Figure 6b. Figure 6a is relabeled "FIG. 6A", and Figure 6b is relabeled "FIG. 6B" to match references in the specification.

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REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1-48 are in this Application. Claims 2, 14, 22-29, and 40-41 have been withdrawn from consideration. Claims 13, 15-21, and 30-39 have been rejected under 35 U.S.C. § 112. Claims 1, 10, 13, 15, 18-20, 37, and 42-43 have been rejected under 35 U.S.C. § 102. Claims 3-9, 11-12, 16-17, 21, 30-36, and 38-39 have been rejected under 35 U.S.C. § 103. Claims 1, 7, 8, 13, 20, 21, 34, 35, 42, and 43 have been amended herewith. New claims 44-49 have been added herewith.

Drawings

The Examiner objected to FIGs. 1a, 1b, 2d, 2e, 2h, 3a, 3b, 4, 5a, and 5b under 37 CFR 1.84(o) because there are no descriptive legends for the boxes. Replacement drawings comprising descriptive legends for the aforementioned figures are herewith provided. The Applicant believes that the corrected drawings overcome the Examiner's objections and should be allowable. Furthermore, corrections to reference characters and/or lead lines are made in FIGS. 1B, 2A, 2D, 2E, and 5B.

35 U.S.C. § 112 Rejections

The Examiner objected to the limitation "a second plurality of PEs" in claim 13 on the grounds that the term "PE" is unclear. In claim 13, an instance of the phrase "processing element (PE)" now precedes use of the term "PEs".

The Examiner objected to the limitation "said optical switch array" in lines 1-2 of claim 34 on the grounds of insufficient antecedent basis. Claim 34 has been amended to recite "at least one of said plurality of optical-switch arrays".

The Applicant believes that the amendments to the claims overcome the Examiner's objections and should be allowable.

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35 U.S.C. § 102 Rejections

The Examiner rejected claims 1, 10, 13, 15, 18-20, 37, and 42-43 under 35 U.S.C. § 102 as being anticipated by U.S. Patent 5,864,414 (hereinafter *Barnsley*). The Applicant believes that there are significant differences between the previously presented claims and *Barnsley*'s teachings which have been overlooked in the Examiner's rejections; however the claims are herewith amended without prejudice for expediting the examination process.

Claim 1 is herewith amended to recite:

"...a plurality of optical-switch arrays, each of said optical-switch arrays serving a processing element (PE), comprising at least one optical switch, coupled to said laser distribution grid, and adapted for deflecting a predetermined portion of a single one of said light propagations, distinct by its wavelength, responsive to an input signal so that another PE served by another of said plurality of optical-switch arrays is designated..."

Support for these amendments is found *inter alia* in paragraphs [0121] and [0134].

Barnsley does not describe claim 1 as amended. In particular, *Barnsley* does not describe an optical switch array that allows a served PE to designate another PE as recited in claim 1. *Barnsley* teaches a head station and a plurality of terminal stations which are connected in a chain configuration wherein each terminal station is capable of passing data to each downstream station (*Barnsley* column 6 lines 31-46). Such a chain configuration only allows each terminal station to directly send information to its immediately downstream terminal station. In such a network, the PE does not designate a PE for receiving data therefrom.

In addition, *Barnsley* does not describe a PE or a switch which is addressable by a distinct wavelength, as recited by amended claim 1. In *Barnsley*, PEs are addressed according to the modulation of a designated wavelength λ_0 that is used for control signaling. The control signaling includes information about data transmission wavelength availability, timing slots, and the terminal destination address, see column

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8 lines 46 to column 9 line 13. Such control signaling is separated from the data that is modulated on a different wavelength λ_i , see column 8 lines 46 to column 9 line 13. The separate wavelength, which is used for control signaling, allows a station to designate data to one of the downstream terminals, see column 8 lines 46 to column 9 line 13. As such, *Barnsley* teaches using a single wavelength for designating multiple client terminals rather than addressing a PE or a switch by a distinct wavelength, as recited by amended claim 1, see column 8 lines 46 to column 9 line 13.

In addition, *Barnsley* teaches a terminal station that transmits information to a destination by modulating information onto both the control signaling wavelength λ_0 and also an additional data transmission wavelength. As such, *Barnsley* deflects at least two light propagations (see *Barnsley* column 8 lines 5-7, column 8 lines 46 to column 10 line 10). Therefore, *Barnsley* does not teach a plurality of optical-switch arrays adapted for deflecting a portion of a single light propagation distinct by wavelength so that another PE is designated.

In view of the above, *Barnsley* does not anticipate the invention of amended claim 1. Applicant believes that amended claim 1 is novel and not anticipated by *Barnsley*.

Claim 10 depends on claim 1, and therefore, is patentable at least for the virtue of being dependent on a patentable base claim.

Reference is now made to the non-obviousness of amended claim 1 in the light of *Barnsley*. As described above, while claim 1 recites a single wavelength for to the purpose of addressing data to a terminal station, *Barnsley* requires two or more wavelengths. *Barnsley* teaches that each one of the terminal stations receives all wavelengths and reads a signaling wavelength λ_0 to determine which one of the received wavelengths contains data directed to it in a subsequent time slot. As such, *Barnsley* teaches away from the invention of amended claim 1 in which a control signaling is not used and terminal station is distinct by the wavelength of the transmission.

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Claims 13 and 42-43 have been amended in a similar manner to claim 1 and therefore, the arguments made above apply *mutatis mutandis* to claims 13 and 42-43. In the light of the above, Applicant believes that claims 13, and 42-43 are novel and not anticipated by *Barnsley*. Claims 15, 18-20, and 37 depend, directly or indirectly, on claim 13, and therefore are each patentable at least for the virtue of being dependent on a patentable base claim.

In addition Applicant added new claims 48-49. New claim 48, which is dependent on claim 1 recites,

"The laser power grid of claim 1, wherein each of said optical-switch arrays serving a PE is configured to directly address every PE coupled to said laser distribution grid."

Support for this claim is found *inter alia* in paragraph [0147]-[0148]. Claim 48 describes a laser power grid in which every PE can directly address every PE, unlike *Barnsley* who teaches that a terminal station can only address downstream terminal stations, and whose addressing is indirect for every downstream terminal station except for the single downstream terminal station which is adjacent in the chain (*Barnsley* column 6 lines 34-46 and FIG. 1).

New claim 49, which is dependent on claim 1, recites:

"The laser power grid of claim 1, wherein each of said optical-switch arrays serving a PE is configured to send data simultaneously to another PE coupled to said laser distribution grid via plurality of light propagations."

The system taught by *Barnsley* requires timing synchronization to allow any particular terminal station to communicate with the downstream terminal stations, (*Barnsley* column 8 lines 46 to column 10 line 10). The device of amended claim 1 does not impose the aforementioned restrictions.

Support for this claim is found *inter alia* in paragraph [0150]-[152] and FIG. 3B. It should be noted that *Barnsley* requires that each terminal station receive light propagations which are transmitted on at least two wavelengths. One light

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propagation is transmitted on a signaling wavelength λ_0 and the other is transmitted on another wavelength λ_i .

35 U.S.C. § 103 Rejections

Under 35 U.S.C. § 103, the Examiner rejected as follows:

- ☐ Claims 3-4, 11, 16-17, 30-31, and 34-36 as being unpatentable over *Barnsley* in view of Official Notice;
- ☐ Claims 5-6 and 32-33 as being unpatentable over *Barnsley* in view of B. Pesach et al., "Free-Space Optical Cross-Connect Switch by Use of Electroholography", Applied Optics, Vol. 39, No. 5 10 February 2000 (hereinafter *Pesach*);
- ☐ Claims 7-9 and 38 under as being unpatentable over *Barnsley* in view of U.S. Patent Application 2004/0208540 A1 (hereinafter *Nakajima*)
- ☐ Claims 12 and 39 as being unpatentable over *Barnsley* in view of S. Yamazaki et al., "A Coherent Optical FDM CATV Distribution System", Journal of Lightwave Technology, Vol. 8, No. 3, March 1990 (hereinafter *Yamazaki*); and
- ☐ Claim 21 as being unpatentable over *Barnsley* in view of U.S. Patent 5,923,449 (hereinafter *Doer*).

The arguments made above in respect of the novelty and non-obviousness of amended claim 1 apply to claims 3-9 and 11-12 which are dependent on claim 1, and based on that, Applicant asserts that dependent claims 3-9 and 11-12 are consequently allowable at least as being dependent on an allowable main claim.

The arguments made above in respect of the novelty and non-obviousness of amended claim 13 apply to claims 16-17, 21, 30-36, and 38-39 which are dependent on claim 13, and based on that, Applicant asserts that dependent claims 16-17, 21, 30-36, and 38-39 are consequently allowable at least as being dependent on an allowable main claim.

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Clarifications

New independent claim 44 relates to a communication network comprising a plurality of continuous-work laser sources, a laser distribution grid, and a plurality of optical-switch units wherein each optical-switch unit serves one of a plurality of PEs and communicates data to any other PE. All of the laser power is available to transfer processing related data between network nodes. This claim is clearly distinguished from *Barnsley* who requires both a dedicated laser wavelength and synchronized time slots to coordinate data communications on all wavelengths. Support for this claim is found *inter alia* in paragraphs [0124]-[0125].

New claim 45 which is dependent on claim 44 describes one or more receivers coupled to the laser distribution grid, wherein each receiver responds only to signals transmitted on a single wavelength. Support for this claim is found *inter alia* in paragraphs [0147]-[0150] and FIGS. 3A-3B.

New claim 46 which is dependent on claim 45 describes a plurality of receivers, each configured to receive data transmitted on a different wavelength. Support for this claim is found *inter alia* in paragraph [0150] and FIG. 3B.

New claim 47 which is dependent on claim 45 describes a plurality of receivers configured to simultaneously receive signals transmitted on different wavelengths. Support for this claim is found *inter alia* in paragraph [0150]-[152] and FIG. 3B.

Amendments are made to claims 1, 7, 8, 13, 20, 21, 34, 35, 42, 43 to improve clarity of the language. There is no substantial change to the claim limitations.

In Claim 1, the phrase "first plurality of continuous-work (cw) laser sources" is amended to "plurality of continuous-work (cw) laser sources". Two instances of the phrase "first plurality of light propagations" are amended to "plurality of light propagations". The phrase "first plurality of laser sources" is amended to "plurality of cw laser sources". The phrase "first plurality of light propagations" is amended to "plurality of light propagations". Two instances of the phrase "second plurality of optical-switch arrays" are amended to "plurality of optical-switch arrays".

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In Claim 7, the phrase "*said first plurality of light propagations*" is amended to "*said plurality of light propagations*".

In claim 8, the phrase "*said first plurality of optical switches*" is amended to "*said plurality of optical switches*".

In claim 13 the phrase "*a first plurality of continuous-work (cw) laser sources*" is amended to "*a plurality of continuous-work (cw) laser sources*", and "*said first plurality of cw laser sources*" is amended to "*said plurality of laser sources*". Two instances of the phrase "*first plurality of light propagations*" are amended to "*plurality of light propagations*". Two instances of the phrase "*second plurality of optical-switch arrays*" are amended to "*plurality of optical-switch arrays*". The phrase "*second plurality of PEs*" is amended to "*plurality of processing elements (PEs)*", and the phrase "*second plurality of PEs*" is amended to "*plurality of processing elements (PEs)*". (See 35 U.S.C. § 112 rejections above.) The phrase "*second plurality of optical modulators*" is amended to "*plurality of optical modulators*".

In claim 20, the phrase "*said second plurality of PEs*" is amended to "*said plurality of PEs*".

In claim 21, the phrase "*wherein said second plurality of PEs*" is amended to "*wherein the number of said plurality of PEs*", the phrase "*said first plurality*" is amended to "*the number of said plurality of cw laser sources*", and the phrase "*second plurality of PEs is assigned*" is amended to "*plurality of PEs is assigned*".

In claim 34, the phrase "*said first plurality of light propagations*" is amended to "*said plurality of light propagations*".

In claim 35, the phrase "*said first plurality of optical switches*" is amended to "*said plurality of optical switches*".

In claim 42, the phrase "*first plurality of continuous-work (cw) laser sources*" is amended to "*plurality of continuous-work (cw) laser sources*". Two instances of the phrase "*first plurality of light propagations*" are amended to "*plurality of light propagations*". Two instances of the phrase "*second plurality of optical-switch*

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arrays" are amended to "*plurality of optical-switch arrays*". The phrase "*second plurality of PEs*" is amended to "*plurality of PEs*".

In claim 43, the phrase "*first plurality of continuous-work (cw) laser sources*" is amended to "*plurality of continuous-work (cw) laser sources*". The phrase "*said first plurality of laser sources*" is amended to "*said plurality of cw laser sources*". Two instances of the phrase "*second plurality of optical-switch arrays*" is amended to "*plurality of optical-switch arrays*". Three instances of the phrase "*third plurality of light propagations*" is amended to "*second plurality of light propagations*". The phrase "*is not greater than said first plurality*" is amended to "*is not greater than said first plurality of light propagations*".

In view of the above amendments and remarks it is respectfully submitted that claims 1, 3-13, 15-21, 30-39, and 42-49 are now in condition for allowance. A prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,



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Date: April 2, 2009

Enclosures:

- ☐ Petition for Extension (one month)
- ☐ Additional Claims Transmittal Fee
- ☐ Letter to Chief Draftsman
- ☐ Annotated Drawing Sheets
- ☐ Formal Drawing Transmittal Sheet
- ☐ Complete Set of Replacement Drawing Sheets